

HEAT CAPACITY AND CALORIFIC INTENSITY CURVES 365

TABLE 7

AIR SUPPLY, OXYGEN REQUIRED AND PRODUCTS OF COMBUSTION OF THE USUAL COMBUSTIBLES

This table is based upon the assumption that air = 1 volume of oxygen, 0.214 volumes of nitrogen, N₂. This assumption is sufficiently accurate for most purposes and greatly simplifies the work of computation. If greater accuracy is desired, use 3.8 volumes for N₂ and 4.8 volumes for air. The volumes may be considered as cubic feet, cubic meters, ounce molecules or gram molecules as desired for the purpose in hand.

Substance Burned, 1 Volume	Molecular		Oxygen Required,			d Required	Products of Complete Combustion with Air.				
	Weight	Formula	O ₂	H ₂ O	CO ₂		CO	SO ₂	N ₂	Ar	Other
Hydrogen. . .	2	H ₂	0.5	1.0	0.5	2.0	2.5	1.0	16.0	2.0	3.0
Carbon* to CO	12	C	0.5	1.0	0.5	2.0	2.5	1.0	16.0	2.0	3.0
Carbon monoxide	28	CO	0.5	1.0	0.5	2.0	2.5	1.0	16.0	2.0	3.0
Acetylene. . .	26	C ₂ H ₂	1.5	2.0	3.0	10.0	12.5	2.0	32.0	4.0	6.0
Ethylene. . .	28	C ₂ H ₄	1.0	2.0	2.0	8.0	10.0	2.0	32.0	4.0	6.0
Ethyl alcohol	46	C ₂ H ₅ OH	3.0	4.0	2.0	12.0	15.0	2.0	64.0	8.0	12.0
Sulphur	32	S	1.5	2.0	0.5	6.0	7.5	1.0	16.0	2.0	3.0
Sulphur dioxide	64	SO ₂	1.5	2.0	0.5	6.0	7.5	1.0	16.0	2.0	3.0

* Carbon may be considered as a gas or as a solid.

TABLE 8

HEAT CAPACITY IN B.T.U. OF GASES MEASURED FROM 32° TO $t = T - 491$ PER CUBIC FOOT OF GAS

Temperature, Degrees F.	N ₂ = 28, O ₂ = 32, H ₂ = 2, CO = 28	H ₂ O = 18	CO ₂ = 44	CH ₄ = 16
32	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00
1112	21.71	20.57	32.44	40.4
1472	20.32	41.46	45.7	57.7
1600	20.32	45.7	57.7	70.0
2552	54.05	85.64	96.5	128.2
2612	62.77	102.5	116.4	156.1
3000	70.00	120.0	136.0	180.0
3600	90.00	160.0	180.0	240.0
4352	100.00	191.0	210.0	280.0
5432	130.4	255.1	296.5	419.8

Adapted from *Les Sources de L'Energie Calorifique*, by Damour, Carnot and Rengade.
NOTE.—AS CBU and other hydrocarbons (C_nH_xN_y) break up at low temperatures around 1450° F., their heat capacity is valueless and such gases cannot be preheated successfully. Some data as to the dissociation of CH₄ and C₂H₄ were given on page 1014 of *The Iron Age*, April 24, 1913.